Institutional Development Award (IDeA) Program
IDeA NETWORKS OF BIOMEDICAL RESEARCH EXCELLENCE (INBRE)
Fiscal Year 2004 Awards by State

The Division of Research Infrastructure (DRI) within the National Center for Research Resources (NCRR) supports the IDeA Networks of Biomedical Research Excellence (INBRE), which promote the development, coordination, and sharing of research resources and expertise that will expand the research opportunities and increase the number of competitive investigators in the IDeA-eligible states. INBRE are intended to enhance the caliber of scientific faculty at research institutions and undergraduate schools, thereby attracting more promising students to these organizations.

IDeA Networks of Biomedical Research Excellence (organized by state) implement the IDeA approach at the state level by enhancing research infrastructure through support of a network of institutions with a multidisciplinary, thematic scientific focus.

Alaska
Delaware
Hawaii
Idaho
Kansas
Kentucky
Maine
Mississippi
Montana
Nebraska
New Mexico
North Dakota
Oklahoma
Puerto Rico
Rhode Island
South Dakota
West Virginia
Wyoming

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Alaska

University of Alaska, Fairbanks
Contaminants and Infectious Agents: Molecular Approaches

Alaska INBRE
Fairbanks, AK 99775-7040

Grant No: P20 RR016466

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Partner Institution
University of Alaska, Anchorage

Outreach Institutions
University of Alaska Southeast, Juneau
College of Rural Alaska, Fairbanks
Alaska Pacific University, Anchorage
Sheldon Jackson College, Sitka

Program Goals

- Enlarge and sustain an inter-campus network for environmental health research
- Focus on molecular toxicology of subsistence species, infectious agents, and zoonotic diseases
- Support research projects of junior faculty, postdoctoral research associates, and graduate students
- Provide research opportunities for undergraduate students throughout Alaska
- Provide outreach activities to students and teachers at smaller colleges in Alaska, health corporations, hospitals, and other organizations at rural sites

- Enhance science knowledge of the Alaskan workforce and expand the undergraduate student pipeline into health careers, with particular attention to Alaska Native students
- Form a core research team consisting of seven recently recruited faculty members
- Recruit two new faculty positions
- Feature bioinformatics as an integral part of the program

Research Projects

- Role of caveolin-1 in AH-R signal transduction
- Structural and functional features of the 5-HT3R binding site
- Essential and non-essential element bioavailability from subsistence foods in an Arctic fox model
- The epidemiology of hepatocellular carcinoma (HCC) and end-stage liver disease in Native Alaskans who are carriers of hepatitis B virus (HBV)
- Algorithms to understand the evolution of complex loci
- A portable and extensible system for genome data management and analysis
- Evolution of the major histocompatibility complex in a natural model

Resources

- Biomedical computer science facility
- Central animal facility
- Scanning electron microscope facility
- Applied science and engineering technology laboratory
- Public health laboratory
- Ecosystem and biomedical health facility

Index Terms

molecular toxicology, infectious agents, zoonotic diseases, minority outreach, public health, rural health care, environmental biology, bioinformatics, dioxin, hepatitis B, cancer, liver disease, epidemiology, minority education

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Delaware

Delaware Biotechnology Institute, University of Delaware, Newark

Delaware INBRE
Newark, DE 19711

Grant No: P20 RR016472

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Partner Institutions
Delaware State University, Dover
Christiana Health Care Services, Newark
Wesley College, Dover

Outreach Institutions
Delaware Technical & Community College, Stanton
University of Delaware School of Nursing, Newark

Program Goals

- Develop junior and early-career faculty in Delaware through mentored biomedical research
- Enlarge the pool of individuals and teams of researchers who can compete successfully for NIH grants
- Strengthen the existing biomedical research infrastructure
- Engage all levels of research potential, including undergraduate students, graduate students, post-doctoral associates, faculty, nurses, medical interns, and medical research personnel through improved biomedical workforce development
- Strengthen the network of all institutions of higher learning across the state and foster an emerging medical research initiative in the Delaware health care system
- Develop research themes in biomedical translational research, bioinformatics, and biotechnology

- Establish an outreach program with internships, personnel exchanges, education and training programs, seminars, and other activities at outreach partner institutions

Research Projects

- Bone stromal factors regulate prostate cancer cell adhesion to human bone endothelial cells
- Understanding cellular response in three-dimensional tissue engineering scaffolds
- Investigation of the role of Rad51L1 in tumorigenesis
- Nano-scale biosensors for neurophysiological applications
- An absorbable gel-forming delivery system for paclitaxel dose-densification
- Small nuclear RNAs in *Microsporidia*
- Extent of nucleophilic participation in the solvolysis of substituted acyl chlorides
- Characterization of a geminivirus encoded suppressor of gene silencing
- Structural and mechanistic studies of vanadium chloroperoxidase by solid-state NMR
- Analysis of 7H24, a new Hedgehog signaling gene
- Integration analysis of an LTR-retrotransposon, Tf1, in fission yeast
- Cytokine-modulated expression of CKB and G-proteins
- Pre-operative and intra-operative surgical planning and guidance
- Genetic variability in two genes of *Borrelia burgdorferi*
- Distribution of Lyme and other tick-borne diseases in Delaware

Resources

- Bioimaging core center
- Bioinformatics core center
- Cellular proteomics core facility
- Custom microarray facility
- DNA sequencing core facility
- Embryonic stem cell culture core facility
- Greenhouse facilities
- Mass spectrometry core facility
- Nuclear magnetic resonance core facility
- Protein production core facility
- Transgenic/chimeric mouse core facility

Index Terms

biomedical translation, bioinformatics, biotechnology, computation, cancer, colorectal cancer, breast cancer, imaging, 3-D reconstruction, public

health, minority education, uterine fibroids, prostate cancer, bone cancer, bioengineering, biosensors, neuromuscular disease, lung cancer, fungal diseases, drug delivery system, drug synthesis, vaccine synthesis, transgenic plants, cell signaling, retrovirus, immune response, virtual surgery, Lyme disease, bioconversion, infectious diseases, women's health

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Hawaii

John A. Burns School of Medicine, University of Hawaii, Manoa
Cellular Basis of Immunological and Neurological Disease

Hawaii State INBRE
Honolulu, HI 96822

Grant No: P20 RR016467

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University of Hawaii, Hilo
Queen's Medical Center, Honolulu

Outreach Institutions
Brigham Young University, Laie
Kapiolani Community College, Honolulu
Windward Community College, Kaneohe
Hawaii Community College, Hilo
Leeward Community College, Pearl City

Program Goals

- Expand and develop competitive research capacity in Hawaii by building on the institutional network foundation begun under BRIN
- Develop multi-disciplinary research projects that explore the cellular basis of immunological and neurological diseases
- Develop core competencies in immunology, cell biology, and developmental biology

- Establish teams consisting of a senior mentor investigator, junior investigators at the lead and affiliated institutions, and graduate and undergraduate students
- Provide outreach activities to undergraduate institutions and community colleges
- Foster the development of individual careers and of institutional research capacity
- Sponsor training and mentoring workshops and seminars
- Provide academic work force development through bioinformatics core training activities
- Enhance the science and technology knowledge of Hawaii's workforce

Research Projects

- Analysis of the regulation of TERT expression in murine primordial germ cells
- Mitochondrial mechanism in HIV neuropathy
- Regulation and function of mast cell secreted proteinases
- Nicotine attraction and addiction in *Drosophila* melanogaster
- Inhibitors of mast cell degranulation and TRPB cation channels from marine organisms
- Comparative respiratory irritancy of oxidant and sulfur oxide air pollutants

Resources

- Bioinformatics core facility
- Biological electron microscopy facility
- Molecular biology core facility
- Vivarium
- Laboratory of molecular medicine and infectious diseases
- Retrovirology research laboratory
- Genomic research core facility
- Tissue culture facilities

Index Terms

immunology, cell biology, developmental biology, neurobiology, cell signaling, imaging, molecular biology, genomics, proteomics, HIV, cancer, aging, infertility, neuropathy, dementia, forensics, toxicology, physical anthropology, addiction, nicotine, inflammatory diseases, asthma, arthritis, air pollutants, ozone

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Idaho

University of Idaho, Moscow

Idaho INBRE
Moscow, ID 83844-4207

Grant No: P20 RR16454

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Albertson College of Idaho, Caldwell
Boise Veterans Administration Medical Center, Boise
Northwest Nazarene University, Nampa
Mountain States Tumor and Medical Research Institute, Boise

Outreach Institutions
Brigham Young University - Idaho, Rexberg
College of Southern Idaho, Twin Falls
Lewis-Clark State College, Lewiston
North Idaho College, Coeur d'Alene

Program Goals

- Continue to build an interdisciplinary multi-institutional research network within the theme of cell signaling
- Support a network of research partners consisting of colleges with developing research missions to enhance the research base
- Maintain an educational pipeline through college and graduate school that offers progressively greater research experiences at each level
- Enhance educational outreach activities at undergraduate colleges

- Create an educated workforce that will sustain a developing biomedical industry in Idaho
- Develop bioinformatics resources as research and teaching tools

Research Projects

- Structure/function analysis of anthracycline reduction by human carbonyl reductase
- Oncostatin M induces VEGF in human breast carcinoma cells: stimulation of angiogenesis *in vitro* and *in vivo*
- Involvement of astrocyte caspase activation and CD40/CD40L interactions in Alzheimer's Disease (with three subprojects)
- Molecular interactions of the pericellular matrix
- Cadmium chelation therapy: development of new agents to prevent/treat heavy metal poisoning
- Investigating differential cell sensitivity to cadmium and cadmium-sequestering molecules
- Distribution of flux control between ADH and ALDH in liver ethanol metabolism (with three subprojects)

Resources

- Microarray core facility
- Molecular biology core facility
- Proteomics core laboratory
- DNA sequencing laboratory
- Bioinformatics facility
- Molecular ecology and genomics core laboratory
- Confocal imaging center
- Cell culture and processing laboratory

Index Terms

cell signaling, bioinformatics, Internet2, cancer, breast cancer, Alzheimer's disease, metal poisoning, alcohol metabolism, alcoholism, prostate cancer, anti-cancer drug toxicity, neurodegeneration, inflammation, bone, cartilage, drug design

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Kansas

University of Kansas Medical Center, Kansas City

Kansas INBRE
Kansas City, KS 66160

Grant No: P20 RR016475

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Wichita State University, Wichita

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Emporia State University, Emporia
Fort Hays State University, Hays
Haskell Indian Nations University, Lawrence
Pittsburg State University, Pittsburg
Washburn University, Topeka
Langston University, Langston, Oklahoma

Program Goals

- Build, strengthen, and integrate biomedical research in Kansas
- Establish a multidisciplinary research network with a thematic research focus in cell and developmental biology
- Provide support to junior faculty at the participating institutions; highlight four investigators each year for career guidance and research support
- Increase the workforce of biomedical researchers in Kansas by delivering special services tailored to the needs of the outreach institutions
- Enhance science and technology knowledge of the Kansas workforce

- Provide analytic and interpretive programs and services in Bioinformatics
- Develop new strategies for improving human health

Research Projects

- Regulation of apoptosis in the *Drosophila* retina
- Role of Caspase-2 in skin cancer prevention
- Analysis of mechanisms that partition dsRNAs to daughter cells following mitosis/meiosis
- Mechanisms of dorsoventral patterning during neural development

Resources

- Bioinformatics core facility
- Imaging core facility
- Teleresearch equipment facility
- Biobehavioral measurement core facility
- Microarray core facility
- Biotech support facility
- Confocal microscopy facility

Index Terms

cell biology, developmental biology, genomics, proteomics, lipidomics, cancer, eyes, skin cancer, nervous system, minority education

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Kentucky

University of Louisville, Louisville

Kentucky INBRE
Louisville, KY 40292

Grant No: P20 RR016481

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Morehead State University, Morehead
Northern Kentucky University, Highland Heights
Western Kentucky University, Bowling Green

Outreach Institutions
Kentucky State University, Frankfort
Murray State University, Murray
Bellarmine University, Louisville
Berea College, Berea
Pikeville College, Pikeville
Transylvania University, Lexington
Kentucky Wesleyan College, Owensboro

Program Goals

- Continue to develop infrastructure and a network of biomedical researchers to increase the capacity for research in Kentucky
- Build a research core to provide eleven researchers with the motivation and support needed to become competitive for independent federal funding
- Nurture research within the themes of genomics and neuroscience

- Develop core research facilities in genomics and bioinformatics
- Provide summer research opportunities for undergraduate students in all affiliated institutions to develop the pipeline of students entering educational tracks toward careers in biomedical research

Research Projects

- Genetic and metabolic adaptation by *Salmonella* to the natural environment
- Antipsychotic drug action after hippocampal damage
- Characterization of putative magnesium transporting P-type ATPases
- Comparing the processes of neural development and regeneration in zebrafish
- RNA-based mechanisms of transcription elongation control
- A butterfly transposon mutagenesis screen for the study of wingless signal transduction
- Mechanisms of transcriptional coordination among phosphorylase kinase genes
- Amphetamine-induced acute withdrawal/reversible depression in rats
- Molecular mechanisms of estrogen-regulated bone resorption
- QSAR of adrenergic receptor antagonist
- Neurotrophin regulation of taste system development

Resources

- Molecular biology core facility
- Bioinformatics core facility
- Genomics centralized facility
- Proteomics core facility

Index Terms

neuroscience, genomics, molecular biology, bioinformatics, genetics, bacteria, Salmonella, antipsychotic drugs, brain damage, Alzheimer's disease, schizophrenia, memory loss, cardiovascular disease, diabetes, asthma, evolution, vision, eyes, retina, metabolic regulation, cancer, anti-cancer drugs, drug addiction, estrogens, osteoporosis, aging, taste, neurological development, women's health

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Maine

Mount Desert Island Biological Laboratory, Salisbury Cove
Comparative Functional Genomics INBRE in Maine

Maine INBRE
Salisbury Cove, ME 04672

Grant No: P20 RR016463

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Partner Institutions
Bates College, Lewiston
Bowdoin College, Brunswick
Colby College, Waterville
College of the Atlantic, Bar Harbor
The Jackson Laboratory, Bar Harbor

Outreach Institutions
Primary Outreach Institutions
- The University of Maine, Orono
- University of Maine, Farmington
- University of Maine, Machias

Secondary Outreach Institutions
- University of Maine, Fort Kent
- University of Maine, Presque Island
- University of Southern Maine, Portland
- Maine Maritime Academy
- University of New England

Program Goals

- Augment and strengthen Maine's biomedical research capacity by further developing the collaborative research and training network initiated through BRIN, and composed of two research institutions, two undergraduate and graduate degree granting institutions, and three undergraduate degree granting institutions
- Strengthen the lead and partner institutions' biomedical research infrastructure
- Develop a multidisciplinary research program with a scientific focus on comparative functional genomics
- Create expanded opportunities for developing competitiveness for biomedical research funding
- Provide research support and core facilities to junior faculty, postdoctoral fellows, and graduate students at participating institutions
- Create year-round and seasonal research and training opportunities for undergraduate students at participating institutions
- Provide outreach activities to students and faculty at other undergraduate institutions and community colleges in Maine to create a pipeline for students to pursue careers in health research
- Enhance the scientific and technical knowledge of Maine's workforce

Research Projects

- Influence of melatonin on neurite growth and regeneration in crustaceans
- Sequencing and characterization of excitatory glutamate receptors in the freshwater snails *Helisoma trivolvis* and *Biomphalaria glabrata*
- Visualization of compensatory auditory interneuron regeneration
- The dynamics of primary B cell responses in teleost fish
- Identification of novel regulatory sequences in ABCB and ABCC subfamily genes by comparative genomic analysis
- Machine learning methods for phylogenetics and genomics
- Bioinformatics of 3'-UTR-based post-transcriptional regulator elements
- Discovery and characterization of conserved motifs that regulate gene expression during spermatogenesis
- Functional characteristics of regulatory sequences predicted from genomic sequences
- Wnt signaling in the developing gastrointestinal tract
- Dioxin exposure impairs embryonic heart development: comparative expression and promoter analysis of the beta 1-adrenergic receptor

Resources

- Zebrafish facility
- Center for membrane toxicity studies
- Center for marine functional genomic studies
- Animal services core facility

- Bioinformatics core facility
- Cell isolation, culture, and organ perfusion core facility
- Gene expression unit
- Marine DNA sequencing center
- Imaging core facility
- Instrumentation core facility
- Oocyte expression and electrophysiology unit

Index Terms

genomics, proteomics, cell signaling, cell biology, neuroscience, cell development, nerve regeneration, hearing, immune response, reproduction, pollution, cardiovascular disease, gastrointestinal tract, environmental health

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Mississippi

University of Southern Mississippi, Hattiesburg
Mississippi Functional Genomics Network

Mississippi Functional Genomics Network
Hattiesburg, MS 39406-5018

Grant No: P20 RR016476

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Mississippi University for Women, Columbus
Tougaloo College, Jackson

Outreach Institutions
Mississippi Valley State University, Itta Bena
Rust College, Holly Springs
Mississippi College, Clinton
Mississippi Gulf Coast Community College, Perkinston
Delta State University, Stoneville

Program Goals

- Develop functional genomics of cancer and of microbial pathogenesis as primary research foci
- Enhance core research facilities in high-throughput genomics, proteomics, cellomics, imaging instrumentation, and bioinformatics, and make them available for use state-wide
- Strengthen biomedical research and training in Mississippi via a multifaceted approach directed toward both faculty and students

- Provide training and mentoring activities through workshops on subjects such as bioinformatics, grant writing and management, publication and presentation, and research techniques
- Prepare a workforce of researchers trained in collection and analysis of massive datasets
- Make the bioinformatics core training tools and software more available through an expanded Web site
- Provide an online clearinghouse for funding opportunities and e-library access to all students and faculty in the state
- Support and mentor eight promising faculty researchers at the partner undergraduate institutions
- Establish experienced scientists as mentors to facilitate development of independent research projects at partner undergraduate institutions
- Enhance undergraduate science training at outreach colleges through summer research awards and workshops

Research Projects

Thematic area: functional genomics of cancer

- The molecular biology of lung cancer
- Proteomics of cytokine induction in tumor cells
- Cell cycle regulation in *Aspergillus*

Thematic area: functional genomics of microbial pathogenesis

- Molecular biology of multi-drug adaptation in *Mucor*
- Functional genomics of IcsA, a pathogenic determinant in *Shigella*
- Molecular analysis of ranaviruses
- Functional genomics of viral oncogenesis in Marek's disease

Resources

- Imaging facility
- Genomics facility
- Proteomics facility
- Cellomics facility
- Pharmacogenomics facility
- Bioinformatics core facility
- Animal facility
- Molecular biology core laboratory

Index Terms

cancer, infectious diseases, bacteria, genomics, proteomics, cell biology, molecular biology, imaging, lung cancer, Marek's disease, virus, minority education

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Montana

Montana State University, Bozeman
Montana Network of Biomedical Research Excellence

Montana INBRE-BRIN
Bozeman, MT 59717-2360

Grant No: P20 RR016455

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University of Montana - Western, Dillon
Montana State University - Northern, Havre
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NIH Rocky Mountain Laboratories, Hamilton

Outreach Institutions
Little Big Horn College, Crow Agency
Stone Child College, Rocky Boy Agency
Blackfeet Community College, Browning
Chief Dull Knife College, Lame Deer
Fort Belknap College, Harlem
Fort Peck Community College, Poplar

Program Goals

- Establish Montana as a leader in research on the epidemiology and pathogenesis of infectious diseases and environmentally-related health issues

- Develop a Montana workforce to meet the biomedical research and economic development challenges of the future
- Increase the number of researchers at undergraduate institutions in the research themes to achieve a sustainable, productive, and competitive research network
- Elevate the research programs at the lead institution to cutting-edge science
- Develop an educational pipeline to careers in health research with expanded research opportunities for students
- Enhance scientific education and offer opportunities to participate in environmental health research for students at the state's Tribal colleges

Research Projects

- Genetic analysis of biofilm formation in *Candida*
- Characterizing the secretory pathway of *Candida albicans*
- Understanding environmental factors in human risk to SNV
- Factors affecting hantavirus transmission
- Novel anti-infectious agents from mine waste microbes
- Prion protein conversion in chronic wasting disease
- Inhibition of fungal amine oxidases
- Health risks from environmental contamination

Resources

- Proteomics facility
- Genomics and laser microdissection facility
- Molecular neuroscience core facility
- Advanced confocal imaging facility
- Supercomputer center
- Veterinary molecular biology laboratories
- Center for computational biology data analysis facility
- Center for biofilm engineering facilities
- Bioinformatics research and training laboratory
- Environmental chemistry laboratory
- Electron microscopy facility

Index Terms

epidemiology, pathogenesis, infectious diseases, environmental health, minority education, Internet2, Candida, hantavirus, biodefense, antibiotics, prion diseases, neuroscience, biofilms, minority education, women's health

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Nebraska

University of Nebraska Medical Center
Nebraska Research Network in Functional Genomics

Nebraska INBRE
Omaha, NE 68198-6395

Grant No: P20 RR016469

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University of Nebraska - Kearney
Nebraska Wesleyan University, Lincoln
Doane College, Crete

Outreach Institutions
Little Priest Community College, Winnebago
Chadron State College, Chadron
Western Nebraska Community College, Scottsbluff

Program Goals

- Establish a multidisciplinary research network with scientific themes of cell signaling, infectious disease, and neuroscience
- Build and increase Nebraska's research base and capacity
- Provide research opportunities for undergraduate students and serve as a pipeline for students to enter health research careers
- Promote research collaborations

- Provide outreach to underrepresented minority students to bring them into the research enterprise and support disease-specific initiatives
- Enhance the science and technology knowledge of Nebraska's workforce
- Support an emerging biotechnology industry in Nebraska

Research Projects

Thematic Area: cell signaling

- Transcriptional regulation of the N-cadherin gene
- Cell signaling associated with the latent membrane protein (LMP-1) that is involved in EBV infection
- The Role of Sub2p, a *Saccharomyces cerevisiae* RNA helicase
- The role of riboswitches in the regulation of gene expression
- Structural characterization of the cpr gene cluster
- *Paramecium bursaria* chlorella virus (PBCV-1)
- Dietary modulation of protein kinase C expression in the intestinal epithelium and its relationship to the development of colon cancer
- Cell signaling and mechanical properties of individual cells in osteogenesis
- Microbial inhabitants of Nebraska wetlands
- Effects of exercise training on remodeling of the diseased heart

Thematic Area: infectious diseases

- Interaction between viruses and host cells
- Characterization of a novel transcriptional suppressor, OTK18
- Disease resistance response in *Arabidopsis* to infection by turnip crinkle virus
- Structure and function of internal ribosome entry sites in viral genomes
- Basis for virulence in high and low virulent strains of *Listeria*
- Regulation of alginate production in *Pseudomonas*
- Antimicrobial properties of the anal and oral secretions of carrion beetles

Thematic Area: neuroscience

- Neuropeptides in the mouse inferior olivary complex
- Gene expression during development of the neural crest
- Traumatic brain injury

Resources

- Molecular modeling core facility
- Bioinformatics core research facilities
- Proteomics facility

- Genetic sequence analysis facility
- Peptide chemistry core facility
- cDNA microarray core facility
- Mouse genome engineering facility
- Mammalian cell culture facility
- Yeast cell culture facility
- Histology facility
- Center for human molecular genetics core laboratories
- Molecular biology core facilities
- Laser-scanning microscope imaging facility
- Flow cytometry core facility

Index Terms

cell signaling, infectious diseases, neuroscience, genomics, proteomics, cancer, colon cancer, bone, bacteria, ecosystems, heart disease, exercise training, myocardial infarction, virus, HIV, immune response, respiratory infections, cystic fibrosis, antibiotics, drug discovery, brain injury, diabetes, minority education

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New Mexico

New Mexico State University, Las Cruces
New Mexico IDeA Networks of Biomedical Research Excellence

New Mexico INBRE
Las Cruces, NM 88003-8001

Grant No: P20 RR016480

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New Mexico Highlands University, Las Vegas
New Mexico Institute of Mining & Technology, Socorro
Eastern New Mexico University, Portales

Outreach Institutions
San Juan Community College, Farmington
Western New Mexico University, Silver City
University of New Mexico - Gallup
Diné College, Shiprock

Program Goals

- Increase the scope of the science and research cores at the two lead research and educational institutions in New Mexico
- Develop research capacity in the thematic areas of structure and function of biomolecules, complex physiological processes in cells and organisms, and pathogens and infectious disease processes
- Build and enhance the biomedical research base through faculty development

- Establish an outreach program for students at four-year baccalaureate, Tribal and community colleges to foster interest in biomedical research education
- Initiate a partnership with the National Center for Genome Resources for bioinformatics training and research
- Provide interactive communications, technical expertise, and data management and analysis tools to all program participants

Research Projects

Thematic Area: structure and function of biomolecules

- Effects of Tom20 and Tom22 on the structure of proteins
- Protein structure-function in gastric microbial pathogenesis
- Functions of apolipoproteins in cancer apoptosis
- NMR investigation of human cksHs1
- Elucidation of the pancratistatin cytotoxic pharmacophore
- Glycosphingolipid-enriched microdomains in cancer cell invasion
- Gene expression patterns during spermatogenesis

Thematic Area: cell and organism

- Molecular biology of steroid receptor in *xenopus* oocytes
- NO-mediated pulmonary vasodilation after chronic hypoxia
- Characterization of Mob1 dynamics in living cells
- To investigate the pharmacology of the mushroom bodies

Thematic Area: pathogens

- Regulation of multi-drug resistance in *staphylococcus aureus*
- Evolutionary consequences of dengue virus emergence
- The role of the N-terminus in HCV capsid formation
- Investigation of degradative enzymes found in Bacitracin
- Bacterial antibiotic resistance in agriculture

Resources

- Structure and function core facilities
- Cell and organismal culture core facility
- Analytical equipment center
- Mass spectrometry core facility
- Bioinformatics core facility

Index Terms

biomolecules, hypertension, memory, cell division, reproduction, pathogens, immunology, inflammation, biodefense, cell biology, organismal biology, antibiotics, cancer, drug resistance, bacteria, dengue fever, Staphylococcus infection, minority education, cardiovascular disease, infectious diseases

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North Dakota

University of North Dakota School of Medicine and Health Sciences, Grand Forks
North Dakota INBRE: Health and the Environment

North Dakota INBRE
Grand Forks, ND 58203

Grant No: P20 RR016471

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Mayville State University, Mayville
Minot State University, Minot
University of Mary, Bismarck
Valley City State University, Valley City

Outreach Institutions
North Dakota Association of Tribal Colleges, Bismarck
Turtle Mountain Community College, Belcourt

Program Goals

- Build biomedical research capacity in North Dakota by serving research universities, baccalaureate institutions, and Tribal colleges in the state
- Initiate competitive, sustainable research programs at six predominantly undergraduate institutions (PUIs)
- Increase the number of students from PUIs who choose to pursue advanced training in the biomedical sciences

- Empower Tribal colleges to strengthen their introductory science curricula to increase the number and level of preparation of Tribal college students transferring to four-year science programs
- Enhance bioinformatics core facilities to provide computational resources and increase state-wide access to electronic resources for biomedical research
- Enhance existing proteomics and biology core facilities at the research universities to make them sustainable and effective training and service centers for the scientific network
- Develop research programs at the PUIs, with a thematic research focus in health and the environment; with three sub-themes: pesticides and non-mammalian biomarkers; nutrition, growth, and development; and genetic factors

Research Projects

Thematic Area: pesticides and non-mammalian biomarkers

- Functional genomics of endocrine disruption
- Determining aquatic bioindicators for atrazine
- Effect of MCPA, 2,4 D and bromoxynil on lung development
- Discovery and development of new anti-fungal drugs

Thematic Area: nutrition, growth and development

- Copper deficiency and ocular health
- Anticancer mechanisms of lycopene action
- Novel fluorescence methods for biomedical applications (overlaps with genetic factors research theme)

Thematic Area: genetic factors

- Analysis of MLL translocations and fusion genes
- Genetic polymorphisms and pre-eclampsia

Resources

- Bioinformatics core facilities
- Proteomics core facility
- Cell biology center
- Nucleic acid analysis facility
- Biology core facility with DNA analysis, cell biology, tissue culture, and bioassay instrumentation

Index Terms

cancer, drug discovery, environmental health, molecular biology, toxicology, genomics, anti-fungal drugs, eclampsia, pregnancy, eyes, pesticides, lungs, lycopene, tomatoes, nutrition, anti-carcinogens, copper deficiency, hormones, minority education, women's health

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Oklahoma

University of Oklahoma Health Sciences Center, Oklahoma City
Oklahoma IDeA Network of Biomedical Research Excellence

Oklahoma INBRE
Oklahoma City, OK 73104

Grant No: P20 RR016478

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University of Oklahoma - Norman
Oklahoma State University, Stillwater

Outreach Institutions
University of Tulsa, Tulsa
Oklahoma City Community College, Oklahoma City
Redlands Community College, El Reno
Comanche Nation College, Lawton

Program Goals

- Build capacity for biomedical research in Oklahoma by supporting promising new faculty, recruiting students into biomedical research careers, and sustaining vital core facilities

- Create a network of institutions that perform biomedical research, teach, and provide patient care; this network includes a historically Black college, a Tribal college, and several other institutions with large enrollments of students from underrepresented minority groups
- Develop research strengths in the thematic areas of microbiology and immunology, cancer, and neuroscience
- Enhance opportunities for investigators at the lead institutions and partner undergraduate institutions to develop independent research programs
- Encourage and mentor participating investigators to develop new NIH grant applications within eighteen months
- Provide summer internships for students to participate in faculty research projects and enroll in new educational programs in bioinformatics and genomics
- Support core facilities in functional genomics and bioinformatics
- Develop a new core facility for functional magnetic resonance imaging in animal research to support statewide research initiatives in cancer and neuroscience

Research Projects

- Analysis of icIL-1 Ra1 and NAG interactions
- Estrogen regulates cytokine expression in the cerebellum
- Osmoadaptation in *Pseudomonas aeruginosa*
- Immunological and photophysical interactions for cancers
- Biosynthesis of isoflavonoid and flavonoid nutrients
- Allosterism in *Escherichia coli* carbamoyl phosphate synthetase
- The role of MMS19 in DNA repair and transcription
- Antioxidant inhibition of gliomas: MRI/MRS evaluation
- Regulation of mismatch repair in Streptococcus pyogenes
- Differences in vaginal ecology associated with bacterial vaginosis

Resources

- Molecular biology resource center
- Flow and image cytometry laboratories
- Genomics support core facility
- Medical glycobiology center
- Laboratory for macromolecular crystallography
- Laser mass spectroscopy facility
- Animal care facilities
- Imaging facility
- BIACORE core facility
- DNA sequencing facility
- Microinjection core facility
- Protein expression core facility

- Microarray core facility

Index Terms

microbiology, immunology, cancer, neuroscience, genomics, bacteria, estrogen, nutrition, Streptococcus, women's health, brain, minority education

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Puerto Rico

University of Puerto Rico, San Juan
Advancing Competitive Biomedical Research in Puerto Rico

Puerto Rico Alliance for the Advancement of Biomedical Research Excellence
San Juan, PR 00931-3346

Grant No: P20 RR016470

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University of Puerto Rico - Humacao Campus
University of Puerto Rico - Cayey Campus
University of Puerto Rico - Mayaguez Campus
Universidad Metropolitana, San Juan
University of Turabo, Gurabo
InterAmerican University of Puerto Rico - Bayamon

Outreach Institutions
Pontifical Catholic University of Puerto Rico, Ponce
Universidad del Este, Carolina
Carlos Albizu University, San Juan
InterAmerican University of Puerto Rico - Metropolitan Campus, Rio Piedras
University of Puerto Rico - Bayamon

Program Goals

- Strengthen the scientific infrastructure and research competitiveness of Puerto Rico by creating the Alliance for the Advancement of Biomedical Research Excellence
- Develop research strengths in the areas of neuroscience, drug design and delivery, and molecular medicine
- Elevate the productivity, competitiveness, and number of human resources needed to attract established investigators in these key research areas
- Promote the development of research skills of talented junior investigators and gifted students
- Establish an administrative core, bioinformatics core, research core, and outreach core to promote the activities in the research areas
- Provide access to technical expertise and data analysis tools for researchers through their high performance computing facility
- Support key resources through a DNA sequencing and multilocus genotyping facility, a proteomics facility, and an access to biomedical electronic scientific informatics project
- Create programs for junior researchers, graduate and undergraduate students to support research and professional development

Research Projects

Thematic Area: neuroscience

- Localization of substance P and acetylcholine in the pathway mediating mucociliary activity
- New methodologies for the synthesis of amino derivatives as nicotinic receptor agonists (also within drug design and delivery research theme)

Thematic Area: molecular medicine

- Identification and expression analysis of ABC genes in *Plasmodium yoelii*
- Cell cycle changes in the galactosemic lens
- Photochemistry and bioactivity of polycyclic aromatic hydrocarbons adsorbed on model surfaces

Resources

- High performance computing facility
- DNA sequencing and multilocus genotyping facility
- Proteomics facility
- Zoological museum
- Herbarium and greenhouse
- Animal care facility
- Microarray facility

- Molecular biology and gene characterization facilities
- Tissue and cell culture facilities
- NMR facility
- Biotesting facility
- Laser and spectroscopy facility
- X-ray crystallography facility
- Mass spectrometry facility
- Surface microscopy and spectroscopy facility
- Time resolved-resonance raman spectroscopy facility
- Automated synthesis and sequencing facility
- Molecular neurobiology laboratory
- Caribbean primate research center
- Visualization laboratory
- Flow cytometry facility

Index Terms

neuroscience, drug design, drug delivery, molecular medicine, genomics, proteomics, eyes, cancer, anticancer drugs, biotechnology, malaria, drug resistance, cataract, hyperglycemia, tuberculosis, carcinogens, pollutants, asthma, sinusitis, cystic fibrosis, bronchitis, artificial blood, minority education, environmental health

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Rhode Island

University of Rhode Island, Kingston
Rhode Island Network for Molecular Toxicology

Rhode Island INBRE
Kingston, RI 02881

Grant No: P20 RR016457

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Rhode Island College, Providence
Providence College, Providence

Outreach Institutions
Community College of Rhode Island, Warwick
Bryant College, Smithfield
City Campus, Providence

Program Goals

- Develop research capacity at the doctoral degree granting and baccalaureate institutions in Rhode Island
- Enhance the capacity of junior investigators to compete for extramural research funds for individual or collaborative projects
- Build a productive, collaborative research program in molecular toxicology
- Train a cadre of undergraduate and graduate students in research instrumentation and methodology for careers in the biomedical sciences

- Maintain and provide inclusive access to state-of-the-art analytical instrumentation through a centralized research facility core
- Establish an effective outreach program for recruiting, training, and mentoring underrepresented scientists and students
- Assist investigators with data mining, data processing, and molecular modeling needs through development of bioinformatics core resources
- Organize seminars and workshops on topics of mutual interest to Network participants

Research Projects

- Methyl tertiary-butyl ether causes testicular injury
- Growth control in the testis and molecular mechanisms of testicular homeostasis in toxicant-induced testicular injury
- Mechanistic studies of protein tyrosine kinase activation by arsenite
- Mechanisms of bacterial mediation of dinoflagellate toxigenesis
- Molecular and biochemical characterization of a secreted lipase in *Leishmania*
- Mechanism of C-SRC activation by oxidative stress
- Role of the antizyme family during *Xenopus* development
- Cell signaling leading to UV-induced cell injury
- Heavy metal-induced alteration of cardiovascular development

Resources

- Centralized research facility core, with equipment for mass spectrometry, flow cytometry, microarray gene chip scanning, protein chip technology, 2-D electrophoresis with spot picking and digestion, gel scanning, protein sequencing, chromatography, fluorescence and light microscopy, spectropolarimetry, fluorescence spectroscopy, UV-visible spectroscopy, radioactivity detection, trace element analysis, centrifugation, cell culture, and other molecular and cell biology applications
- DNA sequencing facility
- Animal care facility
- NMR facility
- Electron microscopy facilities
- Zebrafish breeding colony
- Molecular modeling core facility
- Transgenic mouse facility

Index Terms

toxicology, environmental health, cell biology, proteomics, genomics, cancer, male reproductive health, arsenic, ciguatera, shellfish poisoning,

Leishmania, heavy metals, cell signaling, skin cancer, ultraviolet radiation, minority education

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South Dakota

University of South Dakota, Vermilion
South Dakota Biomedical Research Infrastructure Network

South Dakota BRIN
Vermillion, SD 57069-2390

Grant No: P20 RR016479

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Dakota Wesleyan University, Mitchell
Mount Marty College, Yankton

Outreach Institutions
Sisseton-Wahpeton College, Agency Village
Sinte Gleske University, Mission
Oglala Lakota College, Kyle

Program Goals

- Continue to develop a strong collaborative network within South Dakota to enhance basic biomedical research capabilities
- Foster interdisciplinary research in the control of cell growth, with special emphasis on proteomics and genomics

- Enhance research capacity and critical mass of investigators through mentorship of junior investigators at the lead institution
- Maintain professionally staffed core facilities in proteomics and genomics for use by investigators throughout the state
- Provide increased opportunities for graduate training in the core disciplines
- Provide research support and mentoring for junior investigators and faculty from partner institutions
- Provide training and research opportunities for students at predominantly undergraduate institutions
- Introduce undergraduate students to graduate programs and career opportunities in biomedical sciences and bioinformatics
- Foster interest in further education and careers in science and research for students at Tribal colleges through enhancement of their science education programs and provision of research opportunities

Research Projects

- Human papilloma virus in a Native American population
- Role of HtrA in expression of virulence factors in Streptococcus pyogenes
- Sustained reduction in mean arterial blood pressure following early transient inhibition of renin-angiotensin system in spontaneously hypertensive rats
- Androgens and the corpus luteum
- Regulation of protein translation by ATM in response to insulin
- Host-virus interactions: ranid herpesvirus-1 and the northern leopard frog, Rana pipiens
- The pursuit of novel ionophoric macromolecules based upon 3,4-linked tetrahydrofurans
- Scanning the wheat genome for genes regulating the expression of the genes in the starch biosynthetic pathway
- Systemin and the octadecanoid pathway
- Lipid-based signaling in plants and animals
- Bacterial oxidation of ammonia and methane
- Bacterial succession in specialized habitats
- Statistical and computational support of biology faculty research projects
- The development of a research program in the evolutionary genetics of the genes responsible for transmissible spongiform encephalopathies
- Gene expression in biologically meaningful contexts: functional genomics in close wild relatives of the model organism Arabidopsis thaliana
- Investigation of new kainic acid derivatives
- Obesity, leptin, resistance, and reproductive function in the lethal yellow mouse
- Molecular epidemiological studies of methicillin resistant Staphylococcus aureus

Resources

- Proteomics core facility
- Genomics core facility
- Animal care facility
- DNA sequencing and genotyping core facility
- Fluorescence-activated cell sorting core facility
- Microscopy core facility
- Digital imaging core facility

Index Terms

cell growth, proteomics, genomics, immunology, cell signaling, bacteria, environmental biology, herpesvirus, senile dementia, infertility, obesity, encephalitis, prion diseases, Staphylococcus, antibiotic resistance, infectious diseases, nutrition, biofuels, genital warts, oncology, cancer, gynecology, Streptococcus, toxic shock syndrome, rheumatic heart disease, autoimmune disorders, blood pressure regulation, pregnancy, women's health, reproductive hormones, ataxia-telangiectasia, rare diseases, minority education, cardiovascular disease

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West Virginia

Marshall University School of Medicine, Huntington
West Virginia IDeA Networks of Biomedical Research Excellence

West Virginia INBRE
Huntington, WV 25704-9388

Grant No: P20 RR016477

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- Tri-County Clinic
- Tug River Clinic
- Valley Health Systems

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Outreach Institutions
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West Virginia Wesleyan College, Buckhannon
Davis and Elkins College, Elkins
Bethany College, Bethany
Concord University, Athens

Glenville State College, Glenville
Mountain State University, Beckley
Salem International University, Salem
University of Charleston, Charleston

Program Goals

- Build on the foundation of the successful network of biomedical research and teaching institutions established in West Virginia through the BRIN Program
- Create a multidisciplinary research theme for this network in cellular and molecular biology, with an emphasis on cardiovascular disease
- Establish a programmatic structure to facilitate the research progress, mentorship and training, and career development, of scientists and students at the network institutions
- Expand the scope of the Appalachian Cardiovascular Research Network (ACoRN) developed during the West Virginia BRIN Program
- Provide research opportunities for undergraduate students that will serve as a pipeline into health-related research careers
- Develop activities to advance the outreach institutions to the level of participation of the partner institutions
- Enhance the science and technology knowledge base of the West Virginia workforce through providing workshops, seminars, research training and mentoring, and access to state-of-the-art core facilities

Research Projects

- Aging and Genes in Learning and LTP
- Estrogen Replacement Therapy and Neuron Structure
- Biophysical mechanisms of Hebbian Mossy Fiber LTP
- Specification of Serotonin Cell identity in Drosophila
- ApoE-4 and A Beta Influence on Development of AD
- Spatiotemporal Structure of Visually Evoked Cortical Waves

Resources

- Genetic basis for familial hypertriglyceridemia (FHTG)
- Genetic basis for familial hyperlipidemia (FCHL)
- Integrin regulation of cell death in cancer cells
- Dapsone activation of CYP2C9: A molecular modeling study
- Response of vascular smooth muscle cells to stretch
- AFAP-110 as a regulator of angiogenesis
- Therapeutic interventions to accelerate wound healing in diabetic mice

Index Terms

cell biology, molecular biology, cardiovascular disease, cancer, proteomics, genomics, imaging, computational chemistry, fat metabolism, genetics

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Wyoming

University of Wyoming, Laramie
UW Northern Rockies Regional INBRE

University of Wyoming INBRE
Laramie, WY 82071

Grant No: P20 RR016474

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Eastern Wyoming College, Torrington
Northwest College, Powell

Program Goals

- Continue to build on accomplishments achieved as a result of the BRIN Program
- Increase the competitiveness of Wyoming investigators in obtaining funding from NIH within five years
- Develop research in the themes of integrative physiology, fertility and women's health, and health outcomes in rural populations

- Establish a multidisciplinary research network that will build and strengthen biomedical research expertise and infrastructure at the University of Wyoming and its partner institutions
- Provide role models and build links to other institutions by creating a visiting senior scientist program in which well-established, internationally-recognized scientists will spend three to twelve months at the University of Wyoming
- Provide research support to faculty, postdoctoral fellows and graduate students
- Provide additional research and learning opportunities for undergraduates at the University of Wyoming and the network community colleges to create a pipeline for students to continue in health research careers
- Enhance science and technology knowledge of the state's workforce

Research Projects

- Vitamin E, ovarian cancer, and fertility
- Maternal undernutrition programs and fetal heart gene expression
- Identification of signal pathways involved in transmitter-mediated vasopressin release
- Placentomal vascular adaptations to early maternal nutrient restriction in the ewe
- Building clinical research infrastructures for community-focused health research
- Community-focused health and bio-physiological research

Resources

- Bioinformatics core facility
- Imaging/ microscopy core facility
- Macromolecular core facility
- Center for rural health research and education

Index Terms

integrative physiology, fertility, women's health, public health, ovarian cancer, cancer, nutrition, genomics, cell signaling, rural health, placental development

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